

Preserving Biodiversity Through Indigenous Farming Practices: Toward a Community-Owned Entrepreneurial Model of Seed Conservation

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Abstract

This paper explores how indigenous seed practices are sparking fresh opportunities for rural enterprises that blend ecological knowledge, food independence, and local empowerment. It follows the path from saving traditional seeds to establishing community-managed seed banks and ventures. Women farmers are gaining back control of biodiversity, strengthening climate adaptability, and boosting local economies. Through methods like seed loans, cooperatives, seed tourism, and digital seed storage, efforts such as Navdanya are preserving agricultural diversity while turning it into lasting ways to earn a living. These grassroots efforts link old traditions with modern ideas, shaping a self-reliant system where indigenous seeds become a symbol of resistance and renewal in rural India.

"Whoever controls the seeds controls the food, and whoever controls the food controls the people." — Dr. Vandana Shiva

Executive Summary

Climate unpredictability and corporate control in farming have created challenges, but rural India is witnessing a silent shift through indigenous seed conservation. This paper, 'Preserving Biodiversity through Indigenous Farming Practices', explores how people are reviving traditional seed wisdom that industrial agriculture almost pushed aside. By focusing on indigenous seeds in farming, farmers, including women, are restoring biodiversity while building stronger economies and holding on to their cultural roots.

The paper focuses on the Navdanya movement and similar grassroots initiatives. These efforts have built more than 150 seed banks run by communities in India. These seed banks act as storage spaces for unique and climate-friendly crops. They also serve as centers where social enterprises are growing in number. By offering seed loans supporting farmer groups, hosting organic markets, celebrating through festivals, and even encouraging seed tourism, they are reshaping the rural economy to prioritize mutual support instead of profit and long-term hand-holding over expansion.

The paper looks into how young people contribute to digitizing agrobiodiversity, explores the economic opportunities tied to enhanced seed products, and connects these approaches with national policy plans. Ultimately, it aims to create seed hubs that communities can manage and adapt based on local needs. These hubs aim to rebuild food independence and balance with nature, focusing on forward-thinking ideas, fairness, and ecological understanding rather than clinging to the past.

Introduction: Seeds as Sovereignty

In the villages of India, farming isn't just a job. It's the way of life. Now, something big is brewing, and it didn't start with some tech billionaire or corporate grant. It started with the seed, simple and kind of magical. For generations, India's farmers, especially the women, collected and swapped seeds. We're talking grains, pulses, weird leafy things you won't find at the supermarket. Each one was a perfect fit for the local climate, season, and spirituality. Mostly, they had rituals, stories, and superstitions associated with them, passed down through generations.

But then came the Green Revolution. Suddenly, it was all about "high-yielding" crops, chemical boosters, and one-size-fits-all farming. And just like that, most of those unique seeds disappeared. Now, over 90% of India's native seeds are lost. Along with them, a truckload of nutrition, old-school farming, and control over what grows disappeared. What did we get? Rising costs, dead soil, food that's not good, and a sense that something precious got lost along the way.

However, this crisis also presents a chance for regeneration, where the seed represents resistance and regrowth. People aren't just sitting around crying over lost crops. Across India, communities are fighting back—using seeds as both protest and hope. This whole seed-powered entrepreneurship scene is about taking back the reins, building businesses out of biodiversity, and reimagining what rural success looks like. This paper explores how seed-based entrepreneurship, rooted in community ownership, climate resilience, and ecological wisdom, is shaping rural India's future.

Community-owned Seed Banks: Guardians of Diversity

Community seed banks have become the lifeblood of agrobiodiversity. Serving as local depots of traditional seeds, they are often managed by women and elders who are the guardians of traditions that date back hundreds of years. These banks multiply, store, and spread indigenous seeds like 'Kala Jeera' (Nigella), Rakthashali (Red Rice), Kodo (Rice grass), Sama (Barnyard millet), and Bajra (Pearl Millet)—several of which are drought, flood, and pest-resistant.

More than 150 community seed banks have been established through Navdanya, spanning across agro-ecological regions from Odisha to Uttarakhand. Returning stewardship of seeds to the community, these banks can restore not only biodiversity but also agency. Farmers transform into "Seed Keepers"—masters in the adaptation, preservation, and exchange of their indigenous seeds.

Also, seed banks permit localized responses to global crises. Because of the climate crisis, farmers can obtain resilient seed varieties through Navdanya's "Seeds of Hope" program. These go beyond emergency measures; they are entrepreneurial shifts providing social value as well as economic opportunity.

From Conservation to Enterprise: Seeds as Business

This rural initiative is centered on adopting seed preservation as a business model. Ethnic seeds are now originating as cultural artifacts; instead, they're evolving into branded products, educational tools, and even as facets of tourism.

1. Seed Loans with Interest

Navdanya's model of granting seed loans illustrates circular economics. Farmers get traditional seeds at the time of planting, and after harvest, they return the seeds with a 25% interest in the seeds. This model augments biodiversity for free while fostering a culture of reciprocity rather than dependency.

2. Seed Co-Ops and Farmer Producer Organisation (FPOs)

Seed Keepers usually form cooperatives or FPOs that replicate and sell traditional seeds. These enterprises generate revenue through:

- Local and online seed sales.
- Organic markets and heritage food bazaars.
- Seed festivals are cultural events as well as marketing platforms.

Community-based enterprises like these assist rural farmers, particularly women, in shifting from subsistence farming to agri-entrepreneurship.

3. Training and Capacity Building

Navdanya has its own "Seed University" (Bija Vidyapeeth), where they train people in organic farming, seed selection, documenting biodiversity, and all sorts of regenerative practices. Farmers also teach each other—sometimes over tea, sometimes in full-blown workshops. It's grassroots learning at its best, and it's helping everyone roll with climate change.

4. Value Addition and Market Access

Seeds come packaged and promoted as options labeled heritage, chemical-free, or climate-smart. Certain cooperatives provide seed kits through subscriptions like "Forgotten Grains for Modern Kitchens" or certify their goods with organic and fair-trade labels. These efforts help create rural brands while appealing to urban buyers focused on healthy living.

5. Decentralised & Scalable Seed Bank

Establishing a seed bank in rural areas requires minimal investment and is highly feasible with a small startup cost of approximately 2920 US dollars. This amount is adequate to begin developing a functional model that can be expanded over time. By mobilizing community support and local resources, the initial setup cost can be reduced further. The model emphasizes entrepreneurship and sustainability, with opportunities to expand through the inclusion of diversification blocks and seed production plots at later stages. To ensure community engagement and decentralization, volunteers or local farmer groups can be trained to operate seed bank nodes throughout villages.

To cover costs and scale the initiative, diverse funding sources such as bank loans, CSR contributions, and support from high-net-worth individuals (HNIs) and ultra-high-net-worth individuals (UHNIs) can be explored. This approach not only enhances rural livelihoods but also contributes to biodiversity conservation and seed sovereignty.

Setting up a seed bank in rural areas is a low-cost, high-impact initiative that can be managed with modest resources and strong community participation. A basic seed bank requires storage and office space, which can often be arranged through a village community hall, helping reduce initial infrastructure costs.

Seed Tourism and the Culture Economy

'Seed tourism', in which the villages are considered as cultural hubs, could potentially be promoted as an extension of the seed banks. Villages turn into teaching hubs and cultural landmarks through planned activities like following seed trails with tribal elders or cooking with old grains. Visitors like students, eco-tourists, and chefs join in things like:

- Traditional narratives about planting cycles are tied to the moon.
- Celebrating millet harvests with festivals.
- Learning how to store seeds the traditional way.

Revenue earned from these engaging programs goes back into seed conservation efforts. This builds a system that keeps itself going, respects traditions, and provides jobs.

Youth as Digital Seed-keepers: Reviving Culture, Sustaining Biodiversity

In rural India, many young people have become disconnected from traditional farming practices. However, new efforts are helping them reconnect by taking on meaningful roles as digital seedkeepers. Initiatives like Navdanya and other grassroots programs are guiding youth to become agri-entrepreneurs who use mobile technology to safeguard agrobiodiversity. Through dedicated apps, they document native seed varieties, their genetic traits, growing conditions, and the cultural knowledge associated with them. These tools also support the creation of local seed-

sharing networks and enable the tracking of seeds from farms to the food we consume, bridging tradition with technology.

This shift to digital tools does more than preserve seeds—it keeps memories alive. Young seed-keepers record stories, create multimedia content, and collect information to turn oral traditions into digital collections. This effort not just helps safeguard indigenous knowledge but also spreads it far and wide, improving awareness and creating new market opportunities.

As this movement grows, small seed banks can evolve into self-sustaining social enterprises. Earnings during their first year may be modest, but they can grow depending on the quality of seeds offered, visibility in different digital platforms, and efforts to boost demand by informing both farmers and consumers. Projections suggest that seed banks can earn money by selling and through seed tourism, like hosting festivals and events, which can add substantial income to rural areas.

By combining cultural preservation with entrepreneurship and digital storytelling, this model allows youth to reconnect with their heritage while building a resilient, eco-friendly future for their communities. These digital seed-keepers are not just protecting biodiversity—they are reweaving the cultural and ecological fabric of rural life.

Tentative Annual Income from a small-sized seed bank

At the beginning, earnings remain small but grow every year, depending on various factors. These include the standard of seeds provided to customers, online visibility, and creating demand by raising awareness among consumers and farmers. As these areas advance, there is a big opportunity for growth. This growth paves the way to invest in improved tools and methods. Over time, it does not just increase earnings but also helps build a more stable and eco-friendly farming system.

# No.	Source	Unit cost	Volume	Income
1	Seed Sale	80/Kg	5000 Kg	400000
2	Seed Tourism	1000/person	100	100000
3	Seed festivals	50000	4	200000
	Total			700000(INR)

Ecological and Economic Relevance

This approach tackles several aspects of the rural crisis. Using local seeds helps the environment stay healthy because they need few or no chemicals and adjust better to changing climates. Farmers can take back control over their tools, pricing, and production methods, which helps them improve food sovereignty. This approach also brings back cultural traditions like planting and harvesting rituals that connect communities more. It creates chances for leadership in

conservation and business, offering benefits to women and younger people that boost their economic empowerment.

Scaling the Model: Pathways and Policy Integration

To create widespread change beyond pilot programs, the seed entrepreneurship model needs to align with public programs and national missions.

1. Regional Seed Hubs

India can set up hubs of regional seeds in its various farming regions, like the Indo-Gangetic Plains and the Deccan Plateau. These hubs should focus on seeds that work best for their local environments and create a connected seed network across the country.

2. Youth-Driven Startups

Startups led by young people can save seeds and grow with help like:

- Access to technical guidance.
- Small grants or affordable loans.
- Advice from agricultural universities and labs focused on innovation.

3. Policy Alignment

Connecting efforts with programs like the National Mission on Sustainable Agriculture and programs such as the International Year of Millets or RKVY (Rashtriya Krishi Vikas Yojana) can help gain funds, recognition, and opportunities to expand the reach.

A Shared Ecosystem of Impact

This movement brings together and benefits a wide range of groups, each playing a unique role in shaping a more sustainable and equitable food system. Small farmers and women are at the forefront, leading community seed banks and directly benefiting through improved livelihoods, food security, and greater autonomy over their agricultural choices. Young people, often distanced from traditional farming, are re-engaged as digital entrepreneurs and community leaders, using technology to preserve indigenous knowledge and foster innovation.

Urban consumers are increasingly drawn to traditional, organic, and regional foods, finding in this movement a source of health, authenticity, and environmental responsibility. Policymakers and local governments support these efforts by enabling community-level planning, recognizing the importance of localized food systems in addressing climate change and rural development. Researchers and learners are key contributors, generating new ideas, fostering interdisciplinary collaborations, and facilitating knowledge-sharing across regions.

In addition, indigenous communities benefit through the recognition and preservation of their cultural and ecological heritage. Social enterprises and ethical businesses gain from access to transparent, traceable, and culturally significant supply chains. Philanthropic organizations and impact investors also find meaningful engagement in supporting regenerative models that blend economic empowerment with ecological stewardship. Together, these interconnected groups form a shared ecosystem of beneficiaries, collectively working toward resilience, biodiversity, and food justice.

From Seeds to Sovereignty

Seeds mark more than the beginning of agriculture—they symbolize freedom, respect, and togetherness. India's indigenous seed movement stands as a strong response to climate challenges and corporate control. It highlights how rural populations can take charge to build a fair, sustainable, and eco-friendly economy.

The way forward requires creating seed hubs that fit each region's climate. Young people must push innovation. Women must take charge of enterprises. Communities must protect biodiversity instead of turning it into a product. This vision is not about going back to the past; it is about pushing ahead with seeds, shared experiences, and self-reliance.

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